

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

INTERNAL MEMO

TO: Cindi Mitton

DATE: January 8, 2001

FROM: Michele Ochs

SUBJECT: Gathering of information about radioactivity levels within the ground waters of Death Valley National Park.

As requested by Hisam Baqai, I have been gathering information and contacts concerning radioactivity data for ground water in Death Valley National Park. Currently, much work is being done by the USGS and DOE to obtain background data and to fully understand the regional ground waters in preparation for the proposed Yucca Mountain Repository.

Contacts at the USGS recommended two reports titled "Geochemistry and isotope hydrology of representative aquifers in the Great Basin region of Nevada, Utah, and adjacent states" (1997) and "Isotope hydrology of southern Nevada groundwater; stable isotopes and radiocarbon (2000)". I have ordered both of these reports and should be receiving them soon.

Inyo County established a Yucca Mountain Assessment Office. This office commissioned a report for better understanding of the ground waters of Death Valley. Staff has read this report and examined the data. It is summarized below.

Summary of 1999 report for Yucca Mountain Repository Oversight Program of Inyo County Planning Dept. titled "Death Valley Springs Geochemical Investigation"

Introduction

Yucca Mountain is the site of the only proposed high-level nuclear waste repository in the United States. The Yucca Mountain site is located east of Death Valley National Park in Nye County, Nevada. Inyo County has participated in oversight activities for the proposed repository since 1987 to ensure the siting of this project does not adversely impact public health, environment, or Death Valley National Park.

The repository concept uses the philosophy of multiple barriers, both engineered and natural, each of which impedes the movement of radionuclides into the accessible environment. The principal transporting mechanism for radionuclides is moving ground water. The proposed repository would be in the unsaturated zone above the water table in Tertiary tuffaceous rocks. Beneath the repository at approximate 2-km (6,000) feet is an extensive Lower Carbonate Aquifer known to be highly permeable.

Inyo County's Yucca Mountain Oversight Program identified a number of spring sources in the Death Valley Mountain ranges. This report presents the data from samples collected in 1998 from 23 springs and 2 creeks in Death Valley. Samples were analyzed for concentrations of major cations and anions,

and isotopic ratios of strontium, uranium, and oxygen. The results were compared to sampling data from the Yucca Mountain site.

Problem

The linkages between the alluvial and carbonate aquifers, the recharge and discharge points, and ground water travel time are key to Inyo County's hydrological concerns about the proposed Yucca Mountain repository. Death Valley is the terminus for surface water drainage from Yucca Mountain and Amargosa Valley. It is also believed that ground water from the Lower Carbonate Aquifer discharges into Death Valley via springs.

Objective of 1998 Sampling

The objective of this geochemical study of spring waters was to help further characterize the ground water in the higher altitude Death Valley mountain blocks, to determine the source of these waters and the relationship to the larger springs near Furnace Creek.

Springs of Death Valley

The National Park Service has identified 289 springs and seeps within the boundaries of DVNP. There are two different types of springs.

1. The springs with the greatest discharge are located along the steeply dipping Furnace Creek fault system between the Funeral and Black Mountain ranges east of Furnace Creek. The source of water to these springs is of interest because they discharge from Paleozoic-age carbonate of the same age as the Lower Carbonate Aquifers at Yucca Mountain. The USGS has previously sampled these springs and a number of springs in the Black Mountain range for isotopic analysis.
2. Within DVNP the greatest number of springs are mountain springs and seeps. These are higher altitude and have small volumes of discharge. The chemical composition of these springs was essentially unknown. The characterization of these springs was the focus of this report.

Conclusions

The water sampled and analyzed from small-local mountain springs in the vicinity of Death Valley have a major ion signature that groups the waters nicely by mountain range. The data also shows that these small springs are from local groundwater sources and different from the larger springs near Furnace Creek that are believed to be discharging from a regional groundwater source.

Board Staff Follow-up

Raw data from the small mountain springs included with this report has been interpreted by staff and compared to Primary Maximum Contaminant Levels (MCLs) within the California Drinking Water Standards. MCLs for uranium and strontium 90 are 20 pCi/L and 8 pCi/L respectively. Staff calculations have determined that the small-local mountain springs have uranium and strontium levels below primary MCLs. To our knowledge, these small mountain springs are currently not being used as drinking water sources.

Drinking water for the campgrounds, ranch, inn, and staff housing in the Furnace Creek area is provided from the larger springs in that area. The spring water is chlorine treated prior to use. Staff has requested the National Park Service to provide their data from sampling of the drinking water.

Specific water quality information could be obtained by Regional Board staff annual or semi-annual sampling of the three big springs in the Furnace Creek area. They are Travertine, Texas, and Nevares Springs.

Staff will further study the two USGS reports, upon receipt, to gather more information about radioactivity in ground water within Death Valley National Park.

Inyo County has commissioned further reporting that will narrow the focus to the ground water of the Funeral Mountains that is due in October 2001.

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